

Tribhuvan University
Institute of Science and Technology
Bachelor of Computer Science and Information Technology

Course Title: Simulation and Modeling

Full Marks: 60

Course No.: CSC 302

Pass Marks: 24

Time: 3 hrs

Model Question:

Group A

Long answer questions. (Attempt any two)

(10x2=20)

1. Define system modeling and simulation. Describe the dynamic physical model with suitable example.
2. What do you mean by uniformity test? The following is the set of single digit numbers from a random number generator

6	7	0	6	9	9	0	6	4	6
4	0	8	2	6	6	1	2	6	8
5	6	0	4	7	1	3	5	0	7
1	4	9	8	6	0	9	6	6	7
1	0	4	7	9	2	0	1	4	8
6	9	7	7	5	4	2	3	3	3
6	0	5	8	2	5	8	8	3	1
4	0	8	1	7	0	0	6	2	8
5	6	0	8	0	6	9	7	0	0
3	1	5	4	3	8	3	3	2	4

Using appropriate test, check whether the numbers are uniformly distributed or not.

3. What do you understand by simulation output analysis? Describe the estimation method with suitable example.

Group B

Short answer questions (Attempt any eight)

(8x5=40)

4. Explain different phases of simulation study in brief.
5. Why do we use differential and partial differential equations in simulation?
6. Define random number. Explain the rejection method of random number generation.
7. Explain the process of model validation through the iterative method of calibration.
8. Describe any 5 block diagram symbols of GPSS with suitable diagram.
9. What is Markov chain? Describe different areas of application in short.
10. List out the entities, attributes, activities and state variables for the following systems:
 - a. Traffic system
 - b. Banking system
 - c. Super markets
 - d. Communication systems
 - e. Production system.

11. What do you mean by M/M/1/N/K? Suppose an office working 8 hr per day for 5 days a week gets about 800 telephone calls a week. Find out the number of calls per minute.
12. Explain in brief time simulation.
13. Write short notes on:
 - a. CSMP
 - b. Simulation Run Statistics

Tribhuvan University
Institute of Science and Technology
2067

Bachelor Level/Third Year/Fifth Semester/Science

Full Marks: 60

Computer Science and Information Technology

Pass Marks: 24

(CSC 302 – Simulation and Modeling)

Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Long Answer Questions:

Attempt any two.

1. What is model? What are the different types of model? Give example for each.
2. What do you mean by Queuing system? Explain the characteristics of Queuing system with example.
3. Explain the independence test. A sequence of 1000 four digit numbers has been generated and an analysis indicates the following combinations and frequencies.

Combination (i)	Observed frequency (O_i)
Four different digits	560
One pair	394
Two pairs	32
Three digits of a kind	13
Four digits of a kind	1
	1000

Based on poker test, test whether these numbers are independent. Use $\alpha = 0.05$ and $N = 4$ is 9.49.

Group B

Short Answer Questions:

Attempt any eight questions.

4. What are the advantages and disadvantages of simulation?
5. What do you mean by Pseudo random numbers?
6. Explain non-uniform random number generation.
7. Define a Markov chains and its application.
8. Use the linear congruential method to generate a sequence of three two-digit random integers.
Let $X_0 = 29$, $a = 9$, $c = 49$ and $m = 100$.
9. Why do we use verification and validation in simulation?
10. Explain the data and control statement in CSMP.
11. Explain the iterative process of calibrating a model.
12. Write short notes on:
 - (a) GPSS
 - (b) Server Utilization.

Tribhuvan University
Institute of Science and Technology
2068

Bachelor Level/Third Year/Fifth Semester/Science

Full Marks: 60

Computer Science and Information Technology

Pass Marks: 24

(CSC 302 – Simulation and Modeling)

Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group 'A'

Long Answer Questions:

Attempt any two: (10x2=20)

1. Differentiate between dynamic physical models and static physical models with example.
2. Define the queuing system. Explain the elements of queuing system with example.
3. What is the main objective of gap test? Explain gap test algorithm with example.

Group 'B'

Short Answer Questions:

Attempt any eight questions: (8x5=40)

4. Differentiate between discrete and continuous system.
5. What do you mean by multi server queues?
6. What are the key features of Markov chains?
7. Explain the congruence method of generating random numbers.
8. What do you mean by calibration and validation of models?
9. What are the Kendall notations of queuing system?
10. What do you mean by Hybrid Simulation?
11. Use the mixed congruential method to generate a sequence of three two digit random numbers with $X_0=37$, $a=7$, $c=29$ and $m=100$.
12. Explain GPSS with example.
13. Write short notes on:
 - a) Replication of Runs
 - b) Simulation tools